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Proechimys albispinus minor, a new subspecies from the state of Bahia, northeastern Brazil (Rodentia: Echimyidae)

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Abstract

Described a new subspecies, *Proechimys albispinus minor*, based on specimens from the highlands locality of Morro do Chapéu in the state of Bahia, in northeastern Brazil. The new subspecies can be distinguished by a smaller body and cranial size, finer pelage, absence of an ochraceous subapical zone in the aristiform hairs in the middorsal region, and ochraceous-orange subapical region in the setiform hairs in the middorsal region and outer thighs.

Introduction

Proechimys albispinus was originally described by I. Geoffroy (1838) as *Echimys albispinus* from the Island Madre de Deus, in Todos os Santos Bay in the state of Bahia in northeastern Brazil. In his study of spiny rats from southeastern Brazil, Thomas (1921) established the identity of *E. albispinus* as belonging to the genus *Proechimys*, and also examined specimens from the inland locality of Lamarão which he assigned to a new subspecies, *P. a. sertonius*. Both subspecies occur in the state of Bahia in northeastern Brazil, although they differ in their habitats. *Proechimys a. albispinus* occurs in the islands of the Todos os Santos Bay and the valley of the Paraguassú River in the adjacent mailand, whereas *P. a. sertonius* ranges further inland inhabiting drier habitats (Moojen 1948).

In his review of the taxonomy of the Brazilian forms of *Proechimys*, Moojen (1948) recognized the two subspecies of *P. albispinus* and provided detailed diagnoses of the two forms, which differ in characteristics of the pelage and the skull. As part of a study of the sources of non-geographic variation in cranial metric traits and pelage color variation in *P. albispinus* (Pessôa and Reis 1991; Pessôa and Reis 1995), we examined specimens of *P. a. albispinus* and *P. a. sertonius* and specimens from the highland locality of Morro do Chapéu in the state of Bahia. The specimens from Morro do Chapéu differ in cranial and pelage traits from the two recognized subspecies of *P. albispinus*, and are thought to represent a new form which is described herein.

Material and methods

The specimens examined in this study are housed in the Museu Nacional (MN), Universidade Federal da Paraíba (UFPB), Museu de Zoologia da Universidade de São Paulo (MZUSP), Field Museum of Natural History (FMNH), Museum of Comparative Zoology (MCZ), and the National Museum of Natural History (USNM). The specimens of *P. a. albispinus* and *P. a. sertonius* used for comparison with the

new subspecies were identified with the aid of diagnoses based on standard features of the skull and pelage provided in Moojen (1948). Bacular morphology was also used to ascertain the identity of individuals assigned to the new subspecies. The baculum in the new subspecies is similar in morphology to that of *P. a. albispinus* described in Pessôa and Reis (1992). The following specimens, all from the state of Bahia, were examined: *Proechimys a. albispinus*: Jequié, MN 13 906, 13 907, 13 913, 13 917, 13 938, 13 942, 13 943, 13 948, 13 949, 13 952, 13 954; Macaco Seco, FMNH 18 196, 20 391-20 394, 20 396, 20 397, 20 399, 20 403, 20 404, 20 406-20 410, MCZ 38 311. *Proechimys a. sertonius*: Vila Nova, MN 6 454; Senhor do Bonfim, MZUSP 2 632, 2 633, 2 635-2 637; Lamarão, MZUSP 2 003, MCZ 17 847, USNM 172 952.

Descriptions of hair characteristics are based on Moojen (1948), and hair measurements were taken (in mm) with an eyepiece micrometer. Color definitions follow Ridgway (1912). Cranial measurements were obtained with digital calipers accurate to 0.01 mm.

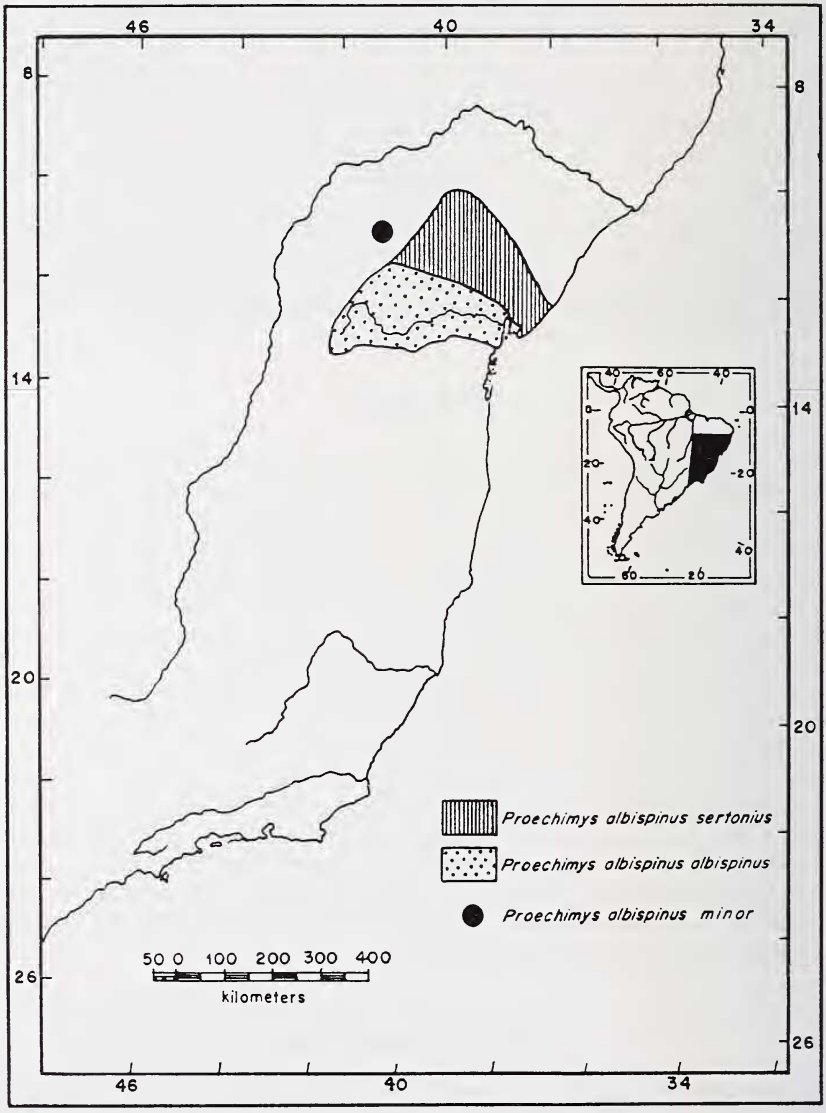

Fig. 1. Ranges for the subspecies of *Proechimys albispinus* according to Moojen (1948). The dot indicates the type locality of *Proechimys albispinus minor*

Results

Proechimys albispinus minor, new subspecies

Holotype: An adult female (MN 34 491), dry skin and skull. Collected by O. S. Farias and M. T. Rodrigues on 28 August 1985 at Morro do Chapéu, state of Bahia, Brazil.

Type locality: Morro do Chapéu (11°33′S, 41°09′W), 800 meters above sea level, state of Bahia, Brazil.

Paratypes: Five specimens, all from Morro do Chapéu (UFPB 772; MZUSP 28 885-28 888).

Distribution: Known only from the type locality (Fig. 1).

Diagnosis: *Proechimys albispinus minor* can be distinguished from *P. a. albispinus* and *P. a. sertonius* by a smaller body and cranial size (Tab. 1), skull with the maxillary portion of the foraminal septum weakly developed, finer pelage, aristiform hairs on the middorsal region always whitish basally and gradually blackening toward tip, and setiform hairs with ochraceous-orange subapical zone.

Description

Pelage: Aristiform hairs on middorsal region: whitish basally, gradually blackening toward tip; total length (mean = 24 mm); maximum width (mean = 1.0). Aristiform hairs on outer thighs: two types of aristiforms. One type whitish basally and gradually blackening toward tip, and the other type whitish basally, grayish in the middle and ochraceous-buff toward the tip; total length (mean = 18.7); maximum width (mean = 0.7). Setiform hairs on mid-

Table 1. Sample size (N), means ($\overline{X}$), standard deviations (±SD), and minimal (Min.) and maximal (Max.) values for selected body and cranial measurements (in mm) in the three subspecies of *Proechimys albispinus*

	Proechimys albispinus albispinus				*Proechimys albispinus sertonius*			
Characters	N	$\overline{X}$ ± SD	Min.	Max.	N	$\overline{X}$ ± SD	Min.	Max
Head and body	6	189.6 ± 6.84	179	198	4	185 ± 7.07	175	190
Tail	6	170.4 ± 9.30	159	179	4	165 ± 10.80	150	175
Greatest skull length	6	46.1 ± 1.17	44.1	47.6	4	45.4 ± 1.47	43.8	46.7
Condylo-incisive length	6	40.1 ± 1.02	38.3	41.4	4	39.3 ± 1.55	37.6	40.6
Zygomatic breadth	6	23.9 ± 0.64	22.8	24.5	4	23.4 ± 0.59	22.8	24.2
Length of nasals	6	15.7 ± 0.46	15.1	15.7	4	15.7 ± 1.11	14.7	16.9
Interorbital constriction	6	10.7 ± 0.33	10.3	10.2	4	10.2 ± 0.55	9.6	10.7
Palatal length	6	15.9 ± 0.40	15.2	16.4	4	15.6 ± 0.92	14.5	16.1
Tooth row length	6	7.7 ± 0.44	7.3	8.3	4	7.3 ± 0.20	7.1	7.5

	Proechimys albispinus minor			
Characters	N	$\overline{X}$ ± SD	Min.	Max.
Head and body	2	160 ± 7.07	155	165
Tail	2	107 ± 26.87	88	126
Greatest skull length	4	40.8 ± 1.44	39.0	42.5
Condylo-incisive length	4	34.7 ± 2.08	32.2	36.9
Zygomatic breadth	4	22.6 ± 0.74	21.5	23.2
Length of nasals	4	13.9 ± 0.62	13.4	14.8
Interorbital constriction	4	9.5 ± 0.30	9.1	9.8
Palatal length	4	14.1 ± 0.49	13.5	14.7
Tooth row length	4	7.0 ± 0.05	6.9	7.1

dorsal region: whitish basally succeeded by grayish, then by subapical zone ochraceous-orange, and blackish tip; total length (mean = 23.0); maximum width (mean = 0.2). Setiform hairs on outer thighs: whitish basally succeeded by grayish, then ochraceous-orange subapical zone, and blackish at the tip; total length (mean = 18.8); maximum width (mean = 0.1).

Skull: Small; bullae small and smooth, jugals dorso-ventrally wide, with conspicuous transverse ridge; postorbital process of zygoma conspicuous and formed by both jugal and

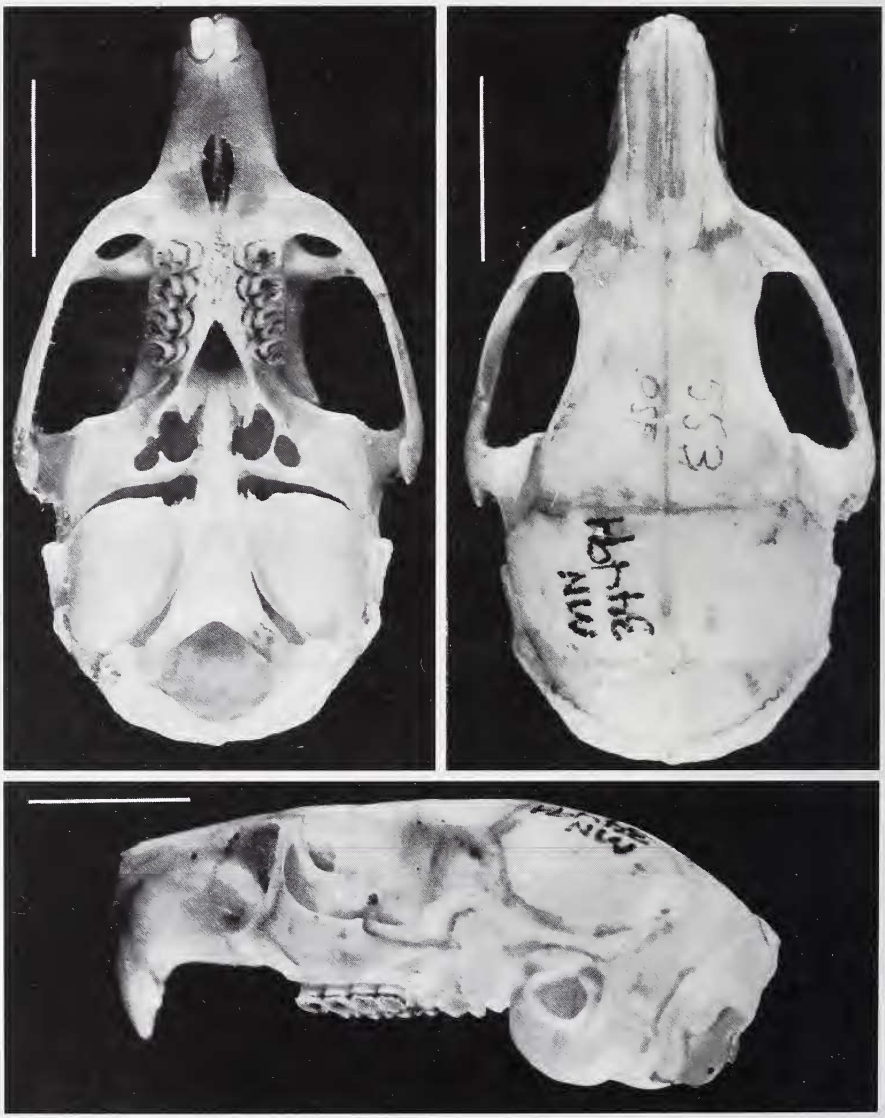

Fig. 2. Ventral, dorsal, and lateral views of the skull of the holotype of *Proechimys albispinus minor* (MN 34 491). Scale at upper left represents 1 cm

squamosal; incisive foramen narrow and short, maxillary portion of the foraminal septum weakly developed; vomerine sheath complete, with the premaxillary part at a lower level than that of the maxillary part; mesopterygoid fossa extending forward as far as anterior plane of second molars (Fig. 2).

Teeth: Molariform teeth with only one counterfold.

Measurements: Measurements (in mm) of the holotype as follows: total length 291; tail 126; hindfoot 34; ear 25; greatest skull length 41.3; basilar length 31.2; palatal length 14.1; toothrow length 7.0; diastema 9.7; rostral length 16.1; nasal length 13.8; interorbital constriction 9.5; rostral breadth 6.4; skull depth 11.9; rostral depth 7.8; maxillary breadth 7.8; zygomatic breadth 22.9; bulla length 8.9; post-palatal length 19.7; incisive foramen length 3.9; mandibular length 21.7.

Habitat: Morro do Chapéu in the state of Bahia is located at the northern edge of the Espinhaço range. This range runs approximately in a south-southwest to north-northeast direction in the states of Minas Gerais and Bahia. Rock formations are the result of a geossinclinal of pre-Cambrian age, and altitudes vary from 800 to 2 000 meters above sea level. The occurrence of plant formations is associated with altitude and soil type. From 800 to 1 000 m the vegetation is characteristically savanna which grades into grasslands between 1 000 and 1 100. Meadows predominate in the highlands due to accumulation of organic matter.

Etymology: The name *minor* refers to the smaller size of *P. a. minor* relative to *P. a. albispinus* and *P. a. sertonius.*

Discussion

The new subspecies, *P. a. minor*, differs from *P. a. albispinus* and *P. a. sertonius* in body and cranial size. *Proechimys a. minor* is approximately 15% smaller in body size relative to *P. a. albispinus* and *P. a. sertonius.* While comparisons of body size are straightforward, differences in cranial size among forms in the genus *Proechimys* must be evaluated considering the problem of indeterminate growth in adults. Patton and Rogers (1983) demonstrated that, for *P. brevicauda*, an average 25% of the variation in cranial size within populations is due to post-ontogenetic growth. A similar result was obtained for *P. a. albispinus*, where variation in cranial size due to age amounts to 17% (Pessôa and Reis 1991). This considerable effect of intrapopulation variation in cranial size may confound the analysis of size differences among populations (Patton and Rogers 1983) and, consequently, size comparisons must be made with individuals of equivalent age classes. Comparisons among *P. a. minor*, *P. a. albispinus* and *P. a. sertonius* were therefore performed with individuals of age classes 6 and 7, defined on the basis of tooth wear criteria and eruption (Pessôa and Reis 1991). The cranial traits measured show that *P. a. minor* is smaller than the other two subspecies. The difference in size is particularly evident from greatest length of skull, which shows that *P. a. minor* is approximately 11% smaller than *P. a. albispinus* and *P. a. sertonius.*

Proechimys albispinus shows unique features of the pelage amongst the genus *Proechimys*, including the shape and color pattern of aristiforms hairs (Moojen 1948), and a case of partial albinism and white spottings (Pessôa and Reis 1995). The new subspecies described here adds to the pattern of pelage variation in *P. albispinus* in that *P. a. minor* lacks an ochraceous subapical zone in the aristiform hairs in the middorsal region, and by the presence of an ochraceous-orange subapical zone in the setiform hairs in the middorsal region and outer thighs. The aristiform hairs in the middorsal region in *P. a. minor* are also thinner than in *P. a. albispinus* and *P. a. sertonius* (Moojen 1948), giving a less spiny appearance to the pelage of *P. a. minor.*

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Zusammenfassung

Proechimys albispinus minor, eine neue Unterart von Stachelratten aus dem Bundesstaat Bahia, Nordost-Brasilien (Rodentia; Echimyidae)

Es wird eine neue Unterart der Stachelratte *Proechimys albispinus* beschrieben, die bei Morro do Chapéu im Hochland von Bahia in Nordost-Brasilien gesammelt wurde. Das neue Taxon ist durch kleine Körper- und Schädelmaße, feinere Fellstruktur und abweichende Bindenmuster der Grannen- und Wollhaare gekennzeichnet.

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